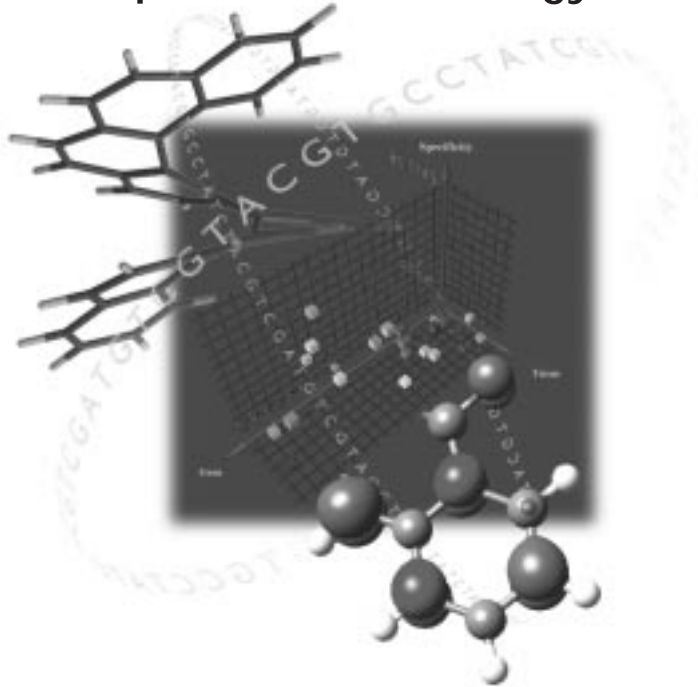


# Computational Biology



## *Redefining the Workflow for Computational Biology*

### Complex Data Integration and Analysis Demands Strategic Computing

Your bioinformatics data is a key strategic asset. How you analyze, distribute, access, and exploit this data will be critical for your success. Integrating and understanding your data requires more than a combination of software and hardware. It requires a successful collaboration between a technology solutions provider and your research team to organize, visually analyze, and distribute research information among a diverse worldwide scientific community. Silicon Graphics offers the right hardware, strong relationships with premier software companies, and a desire to join forces with your researchers to create a complete and productive environment for your organization.

Strategic computing solutions with Silicon Graphics let you redefine your fundamental research and development workflow. Solutions for your core data must let researchers rapidly search local and remote databases, identify trends and areas of focus, visualize molecular models, and exchange textual and visual information across broad distances and scientific disciplines. With Silicon Graphics as your strategic computing partner, you will better exploit the core knowledge of your company and improve your decision making process.

#### **Bioinformatics Software**

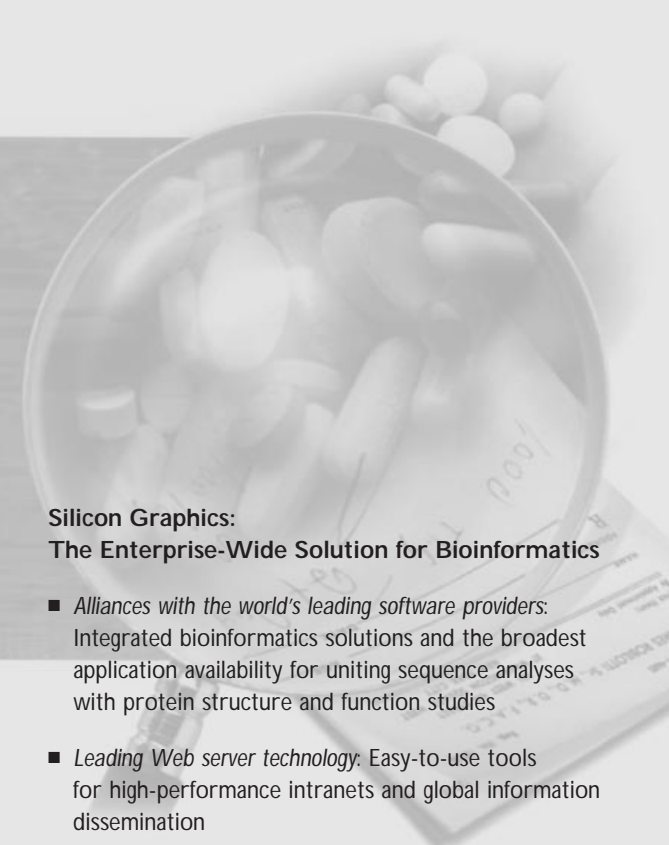
Biology Workbench/NCSA  
 BLAST, parallel BLAST  
 CLUSTAL V, CLUSTAL W  
 d2-cluster  
 FASTA, parallel FASTA  
 GRAIL, XGRAIL  
 HMMER  
 JavaCINEMA  
 KEGG  
 PHRAP, PHRED, SWAT  
 PHYLIP  
 PIMA II, PIMA III  
 Smith Waterman, parallel  
 Staden Package

#### **Key Commercial Solution Providers**

Compugen—GenWeb™, GenCore™  
 Genetics Computer Group®—Wisconsin Package™  
 Incyte Pharmaceuticals—LifeSeq™, LifeTools™, LifeTools 3D  
 LION Biosciences—bioScout™  
 Molecular Applications Group—LOOK™, GeneMine Pro™  
 Molecular Simulations, Inc.—WebLab™  
 Neomorphic Software—Expression, LabTrack LIMS  
 Oxford Molecular Group—OMIGA™, Iditis™, GCG®  
 Pangea Systems™, Inc.—GeneWorld™, GeneThesaurus™, GeneMill™  
 Perkin-Elmer—BioMerge™

#### **Relational and Object Database Software**

Informix  
 Oracle  
 Sybase



**Silicon Graphics:  
The Enterprise-Wide Solution for Bioinformatics**

- *Alliances with the world's leading software providers:* Integrated bioinformatics solutions and the broadest application availability for uniting sequence analyses with protein structure and function studies
- *Leading Web server technology:* Easy-to-use tools for high-performance intranets and global information dissemination
- *Mature and complete 64-bit technology:* High performance for scientific databases and RDBMS platforms including those from Informix, Oracle, and Sybase
- *Scalable architectures:* Software availability from the desktop and scientific enterprise data servers to supercomputers
- *Support of industry standards:* OpenGL®, Java™, and CORBA for optimal integration of diverse software and databases in an open environment
- *Our worldwide team of professionally trained biologists and chemists:* A commitment to life sciences research

## Delivering Data to the Enterprise

As new research methods open up worlds of data, researchers require efficient information infrastructures that let them blend previously separated islands of data into coherent knowledge environments. Silicon Graphics and its bioinformatics software providers are building interactive computing environments using Web technology to enable researchers to distribute and review new discoveries and leverage new data available in global repositories.

Processing and exploring massive quantities of media-rich data calls for compute solutions tailored for managing big data and compute-intensive applications within multinational organizations. The Silicon Graphics® Origin™ server family offers features that meet these challenges:

- A 64-bit hardware and software architecture supporting large memory structures, yielding the best performance for big data applications (database servers can increase buffer space and store more data in memory, speeding common operations such as database joins)
- The high-performance 64-bit eXtended File System (XFS™) for transparently handling the terabyte-sized files on the horizon for bioinformatics programs
- Fast, sustained backups on large databases—backup 1TB\* of data in less than one hour—to speed nightly database updates
- Scalable processing power, storage capacities, and I/O throughput for system expansion without bottlenecks. System throughput levels can increase smoothly and predictably with the power of two to 128 processors

\* "Origin2000 One-Terabyte-per-Hour Backup," a whitepaper, can be accessed on the Silicon Graphics Web site at <http://www.sgi.com>.

"We believe the combination of **Incyte** and Silicon Graphics technologies will allow us to build the most powerful graphic visualization and database mining tools available for the use of genomic information in human health care."

Randy Scott, Ph.D.  
President, Chief Scientific Officer, Incyte Pharmaceuticals



Visualization of the similarity between two genomes, *H. influenzae* and *M. genitalium*, using MineSet toolkit.



## Gaining Insights from Data

Visual computing is reinvigorating organizations around the world. As more people have access to the expanding knowledge base, bioinformatics teams depend on visualization technology from Silicon Graphics to explore intuitive views of protein structures, intermolecular relationships, and other complex points of study. With new insights, scientists and companies are getting higher-quality products to market faster, cutting costs, enhancing communications, and increasing productivity at all levels. The Silicon Graphics MineSet™ data mining and visualization toolkit delivers unique capabilities for viewing and analyzing your large data sets and quickly discovering patterns and trends in the data.

*Global intranet unites HMR's world-wide research teams*

## Solutions in Tune with One Another

The many technical advantages of the Origin architecture have inspired biotechnology software providers to deliver leading bioinformatics and database solutions on Silicon Graphics platforms. Silicon Graphics scientists and application engineers collaborate with these software companies to ensure the availability of the premier bioinformatics solutions on the Origin server family. Applications, including the leading database management solutions, are jointly ported, tuned, and enhanced for Silicon Graphics systems. Successful collaborations are evident in the leading performance results for database and computational software products on the Origin200™, Origin2000™, and CRAY® Origin2000 systems.

## Incyte Pharmaceuticals: Visual Data Mining Solutions for Genomic Data

**Need:** Intuitive tools for analyzing complex gene sequence and expression data.

**Solution:** Incyte developed LifeTools 3D using Silicon Graphics MineSet data mining and visualization tools. Complex genomic data is now displayed as interactive, multidimensional graphics.

**Benefits:** The combination of the software's visual approach and high-performance Silicon Graphics servers speed navigation through the millions of gene sequences in Incyte's LifeSeq database. Scientists quickly spot trends in gene expression data and easily locate novel targets for drug research.

## Hoechst Marion Roussel (HMR): Silicon Graphics Internet Technologies

**Need:** Rapid development and easy maintenance of a scalable corporate intranet; minimal employee training.

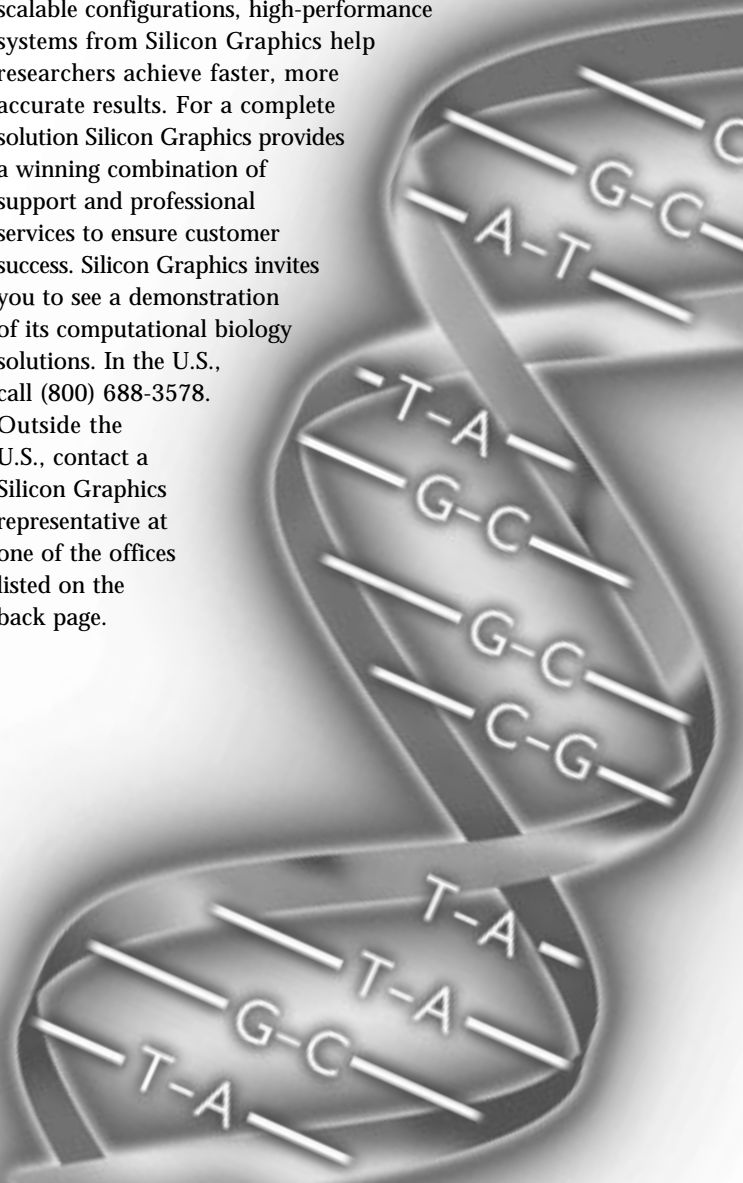
**Solution:** Silicon Graphics Intranet Junction gave HMR control of data flow and allows the company to manage content in its rapidly growing corporate infrastructure.

**Benefits:** Silicon Graphics Intranet technologies minimize the expertise required to set up and manage Web sites. Individual employees and research teams run Silicon Graphics Web tools from any platform to create and organize individual Web sites. Webmasters need not maintain every site on the intranet.

## Information and Insight for Better Discovery







With advanced graphics, fast processing, and scalable configurations, high-performance systems from Silicon Graphics help researchers achieve faster, more accurate results. For a complete solution Silicon Graphics provides a winning combination of support and professional services to ensure customer success. Silicon Graphics invites you to see a demonstration of its computational biology solutions. In the U.S., call (800) 688-3578.

Outside the U.S., contact a Silicon Graphics representative at one of the offices listed on the back page.



# Solutions

At a Glance

	O <sub>2</sub> <sup>™</sup>	OCTANE <sup>™</sup>	ONYX2 <sup>™</sup> SERIES	ORIGIN200 <sup>™</sup>	ORIGIN2000 <sup>™</sup>	CRAY J90 <sup>™</sup> ; CRAY T90 <sup>™</sup> ; CRAY T3E-900 <sup>™</sup>
						
	PERSONAL WORKSTATION	POWER WORKSTATION	VISUAL SUPERCOMPUTER	SERVER	SCALABLE SERVER	SUPERCOMPUTER
<b>BIOINFORMATICS AND APPLICATION DEVELOPMENT</b>	Visual data mining, entry-level sequence analysis	High-end visual and analytic data mining, mid-range sequence database serving	High-end visual and immersive data mining, and scalable sequence databases	Parallel sequence analysis and biostatistics database serving	Highly parallel sequence analysis and database serving, analytic data mining	Massively parallel sequence serving, sequence analysis, analytic data mining
<b>INTERNET AND INTRANET</b>	2D and 3D desktop access/ personal Web server	2D and 3D desktop access/ personal Web server	Visual Web serving	Interactive information exchange, intranet and Internet, media serving, training, personal Web	Interactive information exchange, intranet and Internet, media serving, training, personal Web	N/A
<b>DECISION-SUPPORT AND DATA VISUALIZATION</b>	Visual data mining	Visual and analytic data mining	Visual and analytic data mining	Small –medium data warehousing, analytic data mining	Very large data warehousing, analytic data mining	N/A
To obtain more product, application, and solution information, visit our Web site at <a href="http://www.sgi.com/ChemBio">http://www.sgi.com/ChemBio</a> .						

“Leading-edge pharmaceutical research now demands highly sophisticated systems for accessing and analyzing rapidly growing volumes of genomic data. Effective use of these data is at the heart of drug discovery. Silicon Graphics allows us to offer scalable environments that grow with the data, providing high performance solutions to deliver the fastest, most thorough decision-support systems.”

Myra Williams  
CEO, Molecular Applications Group



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